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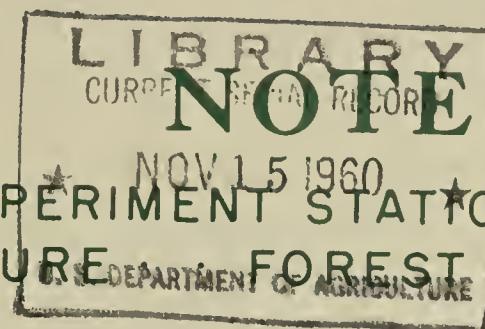
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# TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION  
U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE



No. 591

## Viability of Balsam Fir Seed Depends on Age of Tree

In a test of balsam fir seed collected in a good seed year, viability was related to tree age in trees from 40 to 155 years old. Germination of seed collected from younger trees varied considerably. These were the results of an experiment conducted in mixed coniferous swamps of the Upper Peninsula Experimental Forest in Michigan during the fall of 1958.

Prompt regeneration of mixed coniferous swamps is a major management problem. Although balsam fir reproduction is usually more abundant than that of other conifers in these swamps, even this species often fails to provide satisfactory stocking for many years after cutting.

The problem of securing adequate regeneration is frequently more difficult in overmature stands. One reason may be low viability of the seed from old trees (fig. 1). Balsam fir is considered mature at 70 years, but trees twice this age can be found in swamps. On these sites it is less susceptible to decay and continues growth much longer than on uplands.

Seed was collected from dominant and codominant trees. Five lots of 100 randomly selected seeds from each tree were stratified in moist sand for 90 days at 41° F. Actual germination was recorded for 40 days after sowing. At the end of the test the remaining seeds were cut open to count the number of sound seeds still ungerminated. The sound seed, plus the actual germinated seed, is the potential germination (fig. 1).

Actual germination of seed from trees around 30 years of age ranged from 4 to 46 percent. Another 4 to 13 percent of the seed were sound at the end of the test. Thus the potential germination ranged from 8 to 57 percent. This variation may indicate that trees of this age are just starting commercial seed production. However, Roe found a balsam fir that was producing some seed as early as 15 years of age.<sup>1/</sup>

The best results were obtained from seed of a 41-year-old tree. Actual germination was 63 percent and potential, 68 percent. Seed from older trees decreased in viability with tree age. Actual germination was only 3 percent and potential, 10 percent for a 155-year-old tree. The number of sound seed still ungerminated at the end of the test was not related to tree age.

The ability of balsam fir trees of different ages to restock an area will depend upon the amount of seed production as well as its viability. Total seed production in relation to age was not measured in this study.

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<sup>1/</sup> Roe, Eugene I. Early seed production by balsam fir and white spruce.  
Jour. Forestry 46: 529. 1948.

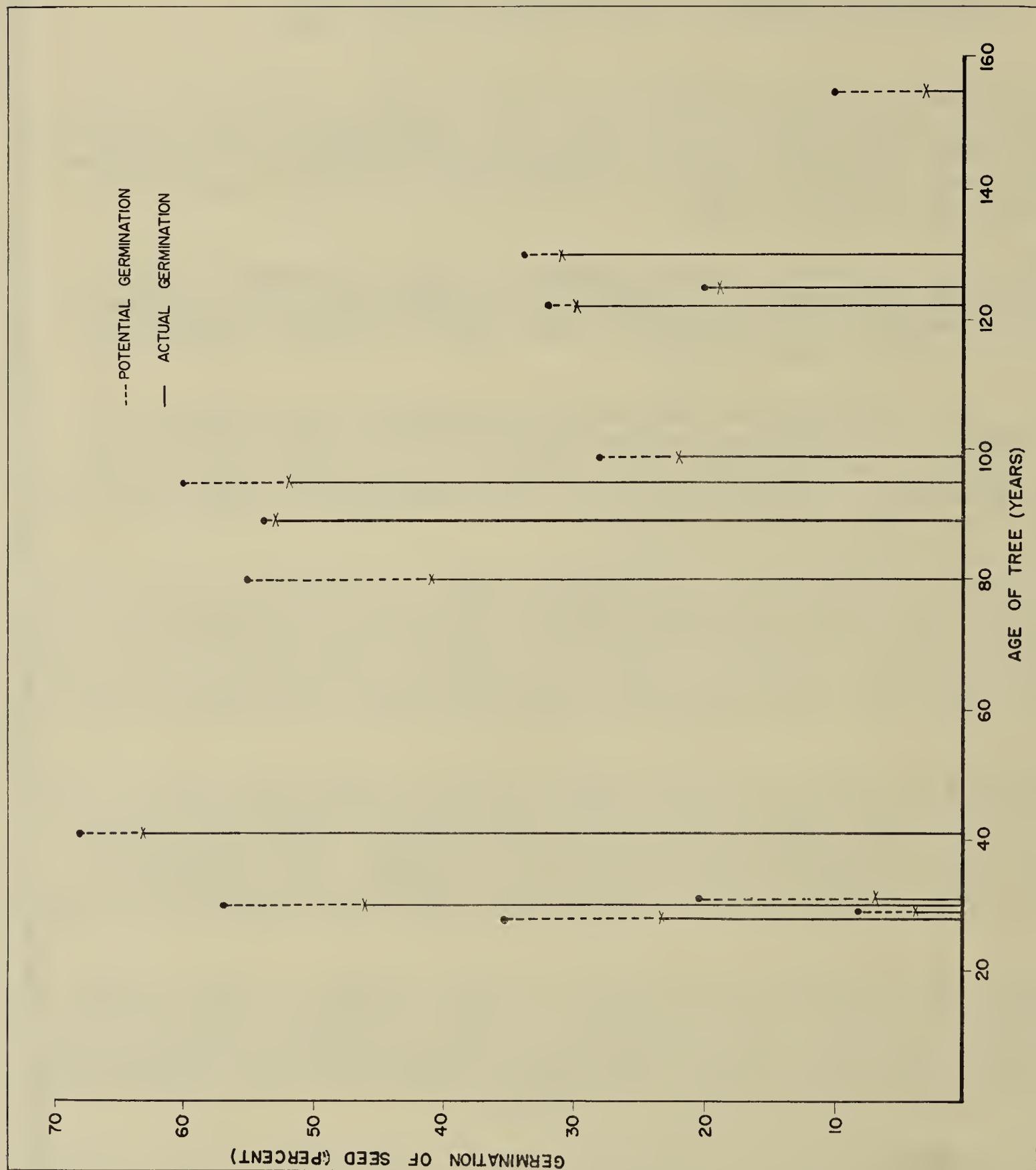


Figure 1.--Relationship of balsam fir seed germination to age of tree